

Assessment of Cases Requiring Surgical Exposure of Impacted Teeth For Orthodontic Treatment: An Institutional Study

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ABSTRACT

INTRODUCTION: Tooth exposure surgery refers to a Procedure which is performed in cases where a tooth has failed to erupt properly. Most often, the procedure is performed when a tooth has been blocked from erupting because of dental crowding. The aim of the study was to assess the cases requiring surgical exposure of impacted teeth for orthodontic treatment.

MATERIALS AND METHODS: This was a descriptive study which was performed under a university setting where all the patients reported to Saveetha dental college and hospitals, Chennai. The data of patients who underwent surgical exposure of impacted teeth for orthodontic treatment from June 2019-February 2021 was collected from DIAS (Dental Information Archiving Software) . The data was collected , tabulated, statistical analysis was done by SPSS -IBM .

RESULTS: From the statistical analysis it is found that the total number of cases requiring surgical exposure for orthodontic treatment was found to be n=43 between the age groups of 11-35 years with female prevalence. The overall prevalence for impacted tooth surgical exposure was found to be upper canines (18.60%).

CONCLUSION: Within the limitations of the current study, it was found that surgical exposure of impacted teeth are more common among 16-20 years of age with female predilection with higher incidence of maxillary canine.

KEYWORDS : Impacted tooth, surgical exposure, age, gender, orthodontics, innovative technique

INTRODUCTION

Tooth impaction is a condition in which the tooth is embedded in the tissue such that it's eruption is prevented.(1)(2) Management of impactions is usually either by surgical exposure and forced eruption or extraction, the decision depends upon a multitude of factors that need to be assessed via clinical and radiographic evaluations of the patient before formulating the overall treatment plan.(3) It involves surgical exposure followed by fixed braces for two to three years to bring the tooth into alignment within the dental arch.(4)

There are two types of surgical exposure which can be classified as open and closed exposure. (5)In open exposure, a window of tissue around the tooth was removed and glass ionomer cement is placed on the crown to prevent the gingival overgrowth during spontaneous eruption.(6) In closed exposure involves surgical uncovering of the tooth

with a full thickness mucoperiosteal flap dissected off the bone(7) . The bone covering the tooth is removed and an attachment with a chain is bonded to the exposed tooth. The palatal flap is repositioned and sutured back with the chain penetrating through the mucosa(8). Before formulating the treatment plan, the clinical evaluation includes assessment of patient age, oral hygiene and dental caries, depth of impaction , displacement of the impaction and associated pathologies, esthetics and morphological suitability of the impaction, functionality of the impacted tooth, feasibility of surgical exposure and orthodontic alignment.(9) These factors are among the issues that are influential in deciding whether to expose or to extract the impacted tooth.(10) Patient cooperation and compliance are additional determinants which should be considered before commencing treatment.

The best age for tooth exposure and forced eruption or surgical extraction is in childhood and adolescence, because as age increases , the impacted tooth often develops ankylosis, precluding the possibility to move into the dental arch orthodontically.(11,12) The inability to move the impaction may not be readily diagnosed preoperatively and may become evident only when the tooth fails to move after it has been exposed and orthodontic traction has been applied for several weeks or more

Impactions that are very deep may not be amenable to exposure and orthodontic therapy. Sometimes even surgical removal of such teeth is not indicated especially when harm may be inflicted upon vital structures or teeth in the course of procedures such cases left alone and followed periodically with radiographs every 6-12 months for changes in the follicle of impaction. Removal of crown only is another option. Our team has extensive knowledge and research experience that has translated into high quality publications. (13),(14),(15),(16),(17–26) (27),(28–30).(31,32). Thus, the aim of the present study was to assess the cases requiring surgical exposure of impacted teeth for orthodontic treatment.

MATERIALS AND METHODS

The current study was a comparative , descriptive , retrospective study which was performed under a university setting where all the patients between 11-35 years reported to the Dental institution were obtained. The study was conducted in a university setting. The pros of the study was that it included a varied population and had the ability to perform preference analysis. The cons of our study was it had a limited geographic area of coverage and a small sample size . The ethical approval was obtained from the Institutional Ethical Committee. The selection of patients was from the list of patients who underwent surgical exposure for orthodontic treatment between 11-35 years who visited the clinic from the month of June 2019-February 2021. The data collected from reviewing the records of all the treatments done in the Department of Oral surgery which was offered by the university . The inclusion criteria was all patients between 11-35 years of age whose clinical examination revealed presence of spacing, crowding, and proclination of the tooth . Incomplete and censored data were excluded and also surgical exposure for other reasons also excluded. The total sample size obtained from 11-35 years of age was found to be n=42 . All the 42 case sheets were cross verified with photographs and reviewed by additional reviewers. To minimise sampling bias, a simple random sampling method was used. The data had high internal validity and low external validity. The data was entered in a methodological manner and it was tabulated in Microsoft excel sheet. The tabulated data was imported and compiled for statistical analysis using SPSS software. Chi square test was done to find the significance of the study, which was set at $p < 0.05$ as statistically significant.

RESULTS

From the statistical analysis it is found that the total number of cases requiring surgical exposure for orthodontic treatment was found to be n=43 between the age groups of 11-35 years with female prevalence. The overall prevalence for impacted tooth surgical exposure was found to be upper canines (18.60%).

Figure 1 represents the frequency of study subjects based on age . The total number of surgical exposure of impacted teeth for orthodontic treatment was found to be n= 42. The age group between 16-20 years was found to be higher (41.86%) followed by 11-15 years of age (30.23%) and the least age group was 26-30 years (2.33%)

Figure 2 represents the distribution of study subjects based on gender . Females had higher prevalence of surgical exposure (65.12%) than males (34.88%)

Figure 3 denotes the frequency of tooth number with surgical exposure. Maxillary canines were found to have higher surgical exposure of impacted teeth (18.60%) followed by lower canines (11.63%). The least tooth which has undergone surgical exposure was found to be upper right first molar.

Figure 4 denotes the association between age and tooth number. At 11-15 years of age, the second quadrant has undergone higher surgical exposure (16.28%) followed by first quadrant (11.63%) and third quadrant has not undergone any surgical exposure and the least was found to be fourth quadrant (2.33%). In 16-20 years, the first quadrant has undergone higher surgical exposure of impaction (16.28%) and the least commonly associated was third quadrant. In 26-30 years, the third quadrant shows more prevalence of impaction. In 31-35 years, the third quadrant shows more prevalence followed by the fourth quadrant.

Figure 5 shows the association between gender and tooth number. First quadrant was found to have higher surgical exposure for females (18%) than males (9.30%). Second quadrant was found to have higher surgical exposure for both males and females (14%). Both the third and fourth quadrants were found to have higher surgical exposure for females than males.

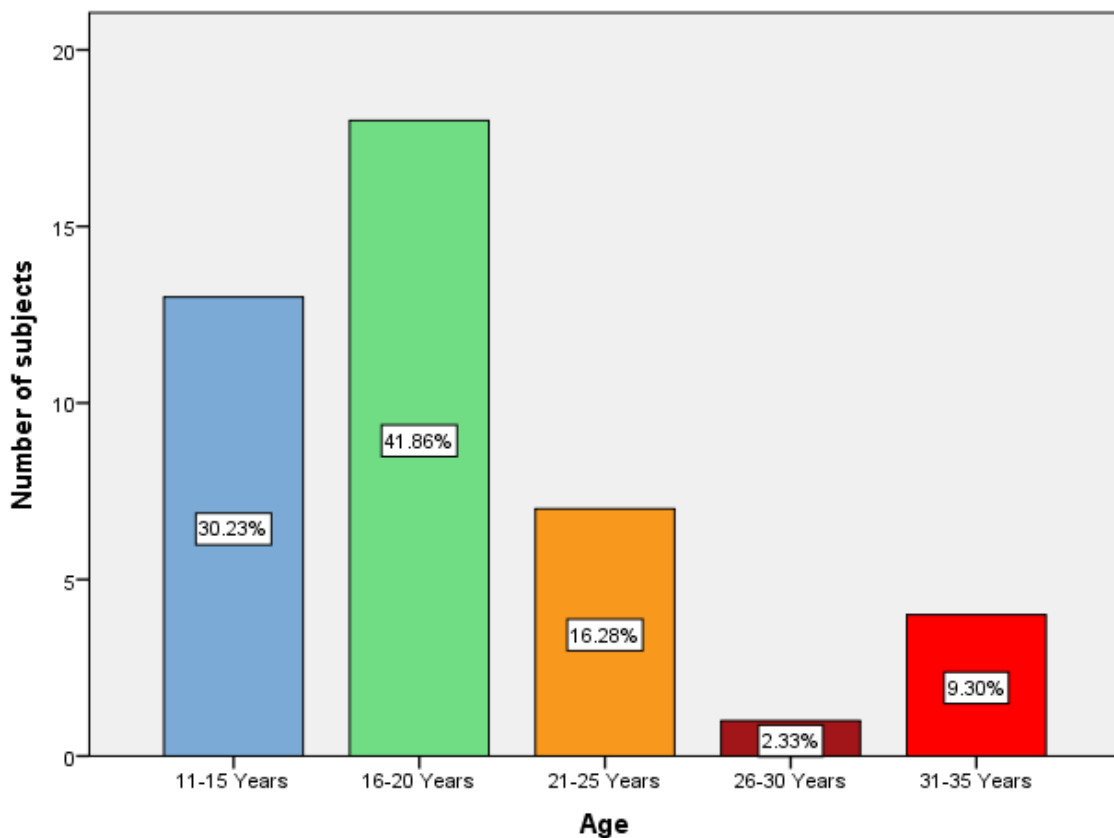


FIGURE 1 ; Bar graph depicts the frequency distribution of surgical exposure based on age. X axis represents the age group of the subjects and the Y axis represents the number of cases. The age group between 16-20 years was found to be higher (41.86%) (green) followed by 11-15 years of age (30.23%) (blue) and the least age group was 26-30 years (2.33%) (red colour)

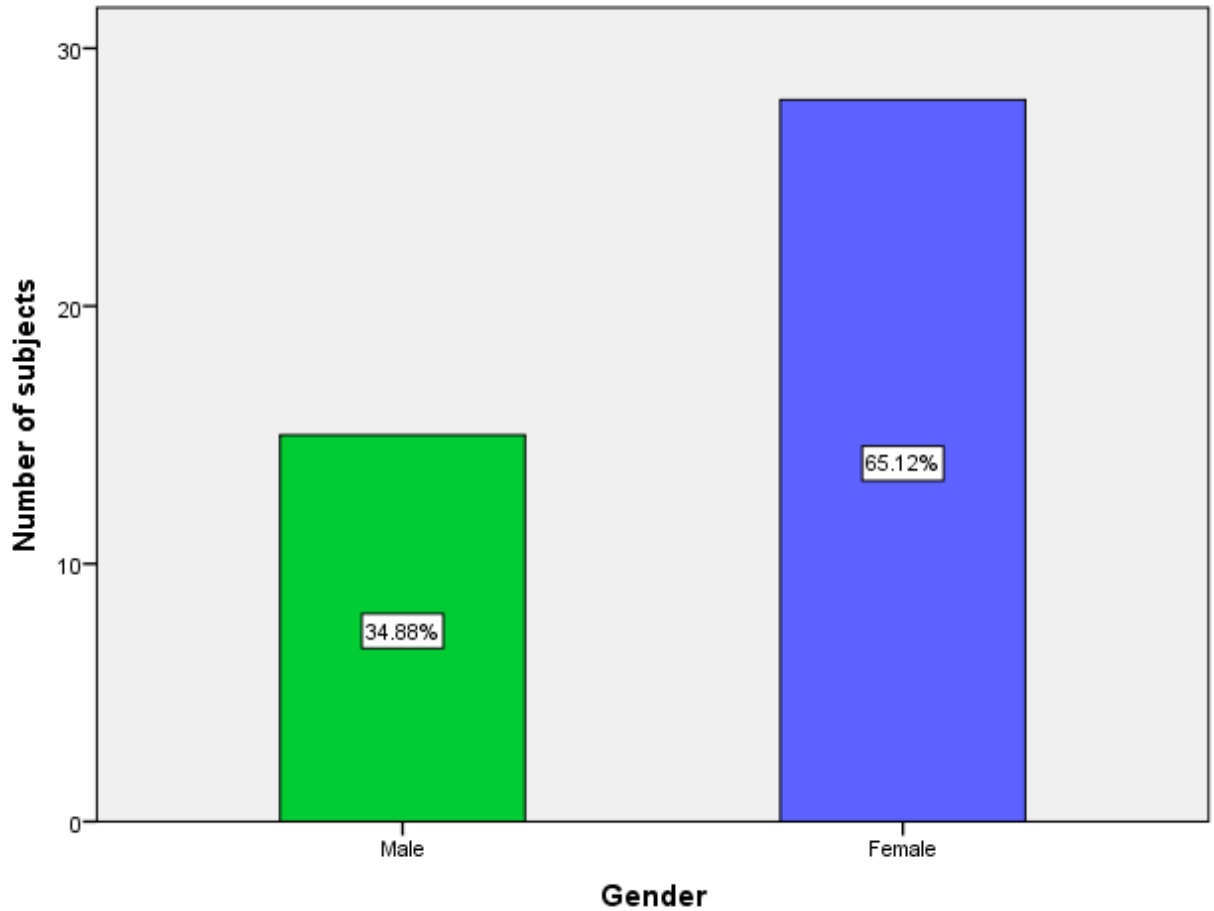


FIGURE 2 : Bar graph represents the distribution of study subjects based on gender. The x axis represents the distribution of gender and the y axis represents the number of cases . Females had a higher prevalence of surgical exposure (65.12%)(blue colour) than males (34.88%) (green colour).

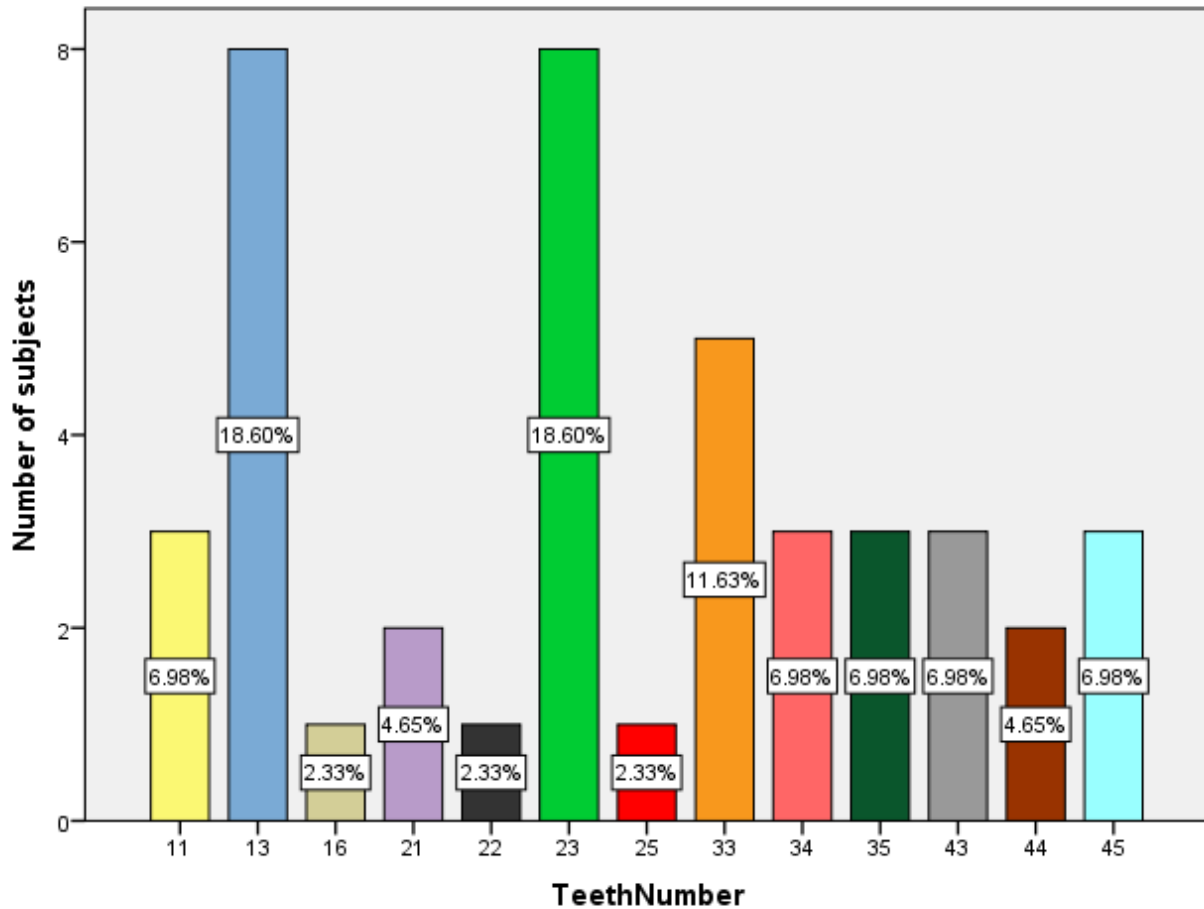


FIGURE 3 : Bar graph denotes the frequency of tooth number with surgical exposure. The x axis represents the distribution of tooth number and y axis represents the number of cases. Maxillary canines were found to have higher surgical exposure of impacted teeth (18.60%) (blue and green colour) followed by lower canines (11.63%)(orange). The least tooth which has undergone surgical exposure was found to be upper right first molar.(brown colour).

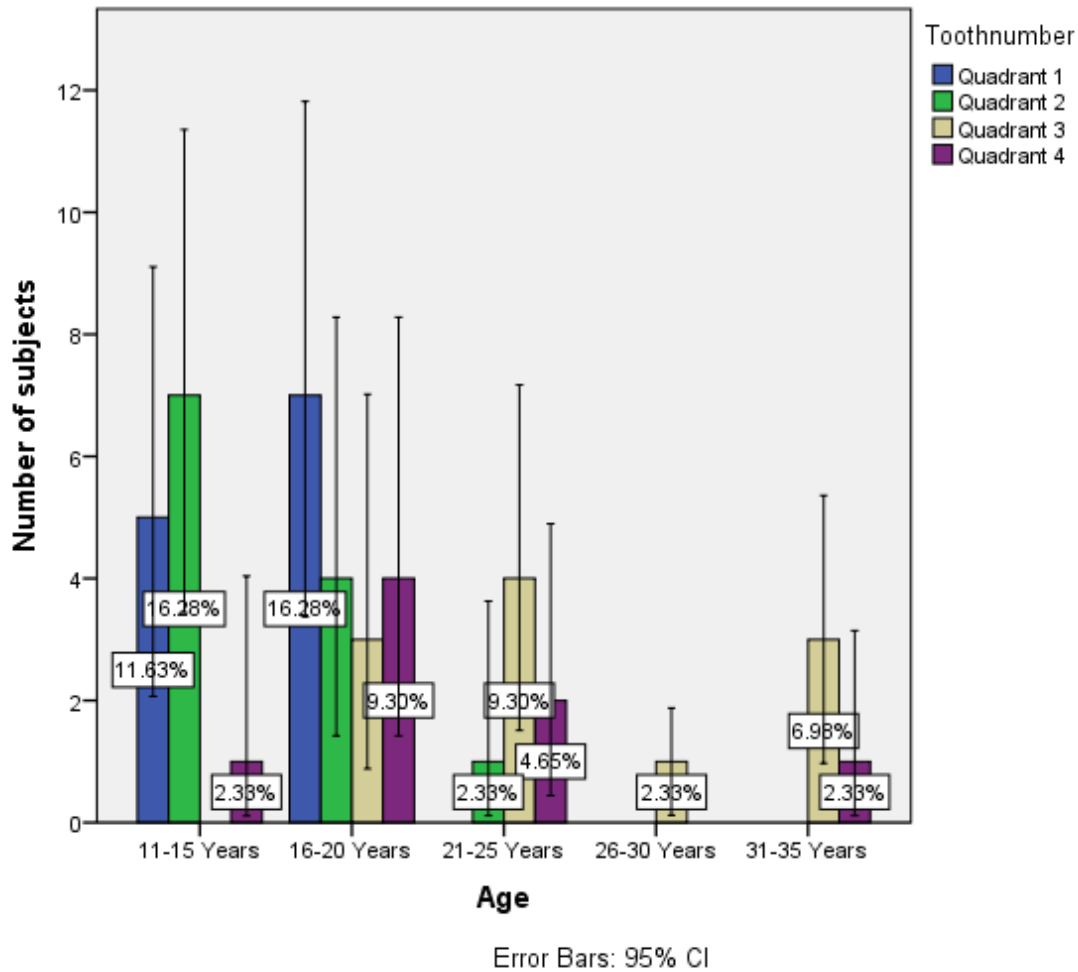


FIGURE 4 : Bar graph denotes the association between age and tooth number. The x axis represents the association of age group of the subjects and the y axis represents the number of subjects . At 11-15 years of age , the second quadrant has undergone higher surgical exposure (16.28%) followed by first quadrant (11.63%) and third quadrant has not undergone any surgical exposure and the least was found to be fourth quadrant (2.33%). In 16-20 years , the first quadrant has undergone higher surgical exposure of impaction (16.28%) and the least commonly associated was third quadrant. In 26-30 years , the third quadrant shows more prevalence of impaction . In 31-35 years , the third quadrant shows more prevalence followed by the fourth quadrant .The blue colour represents the first quadrant . The green colour represents the second quadrant. The brown colour represents the third quadrant and the violet colour represents the fourth quadrant.The results were statistically significant [Pearson’s chi square test, P=0.02].

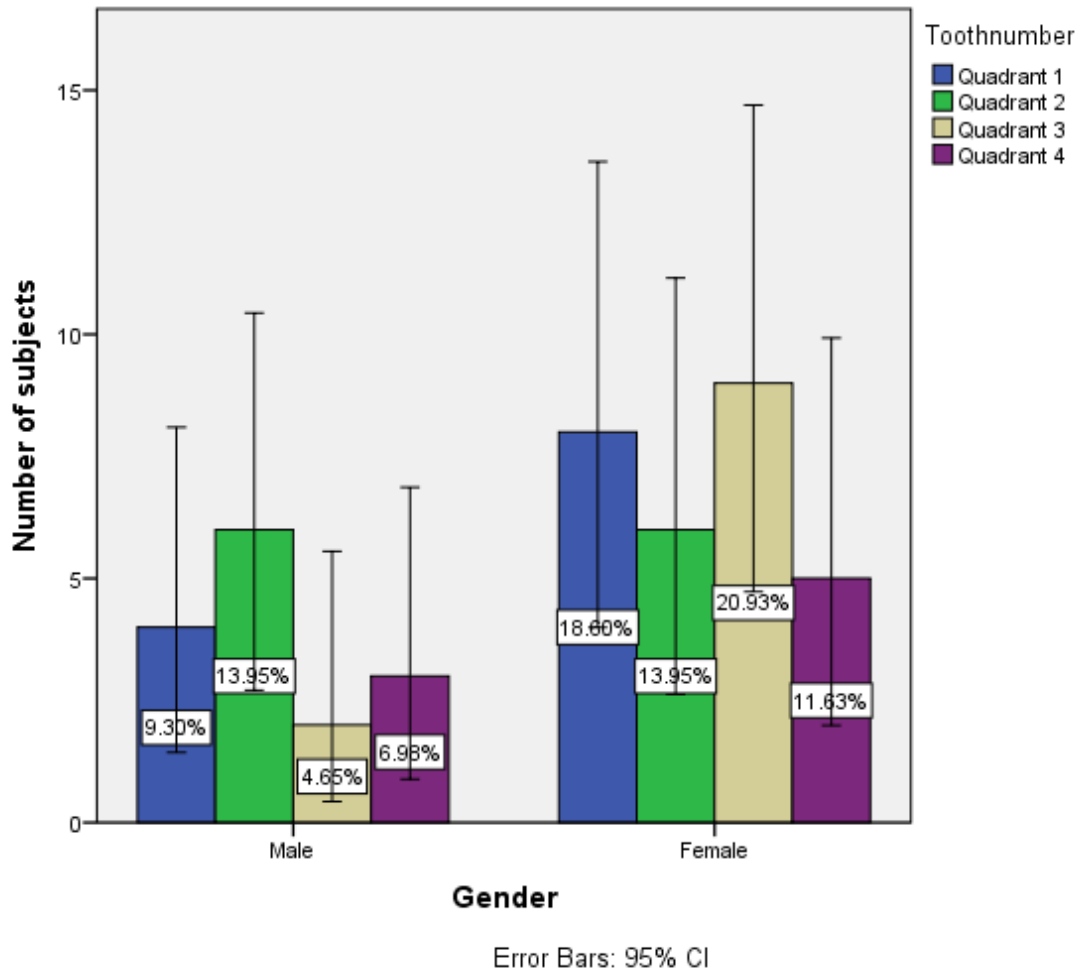


FIGURE 5 : Bar graph shows the association between gender and tooth number. The x axis represents the association of gender and the y axis represents the number of subjects. First quadrant was found to have higher surgical exposure for females (18%) than males (9.30%) . Second quadrant was found to have higher surgical exposure for both males and females(14%) . Both the third and fourth quadrants were found to have higher surgical exposure for females than males .The blue colour represents the first quadrant . The green colour represents the second quadrant. The brown colour represents the third quadrant and the violet colour represents the fourth quadrant. The results were statistically not significant [Pearson’s chi square test, P=0.45].

DISCUSSION

The surgical exposure operation was primarily carried out in order to boost the success rate of orthodontic therapy so that it may be carried out in a variety of ways. (33)The most common cause of surgical exposure is the impaction of that particular tooth.(34)

Patients between the ages of 16 and 20 had a higher rate of surgical exposure than those over the age of 20. This was mostly consistent with the findings of a previous study by Stylianos et al. , in which juvenile patients were frequently involved in surgical tooth exposure, owing to the presence of retained deciduous teeth and a smaller arch size(35). Pathological blockages, misalignment of the permanent tooth beneath, trauma, and infection are the most common causes of retained deciduous teeth. (36)

In this study, the gender distribution revealed that females are more usually involved in surgical exposure than males, and this conclusion was similar to Parkin et al. , who found that roughly 64% of the females in the study were involved in surgical exposure of the tooth. (37)The high frequency reported in females is attributable to the difference between male and female growth rates(38). This is primarily owing to the fact that females are more frequently referred for orthodontic treatment, most likely due to their greater cosmetic demands.

Canine teeth were the most often impacted teeth in this investigation.This finding was comparable to that of Hassan Al- Zoubi et al. , who found that 68 percent of canine teeth were impacted in their study.(39) Large tooth size, aberrant position of the tooth bud, presence of alveolar cleft, and ankylosis were the main causes of canine impaction.(40)

The discovery of the third quadrant was more common in roughly 57 percent of cases in women, according to a previous study by Muhammad et al. , since women were more likely to seek orthodontic treatment for their cosmetic concerns.(41) This was mostly in line with the findings of this study, which revealed that the third quadrant was the most often impacted tooth in the majority of females.

The study's key flaw was that it was a single-centered study with a small sample size and geographical restrictions. The study's future goals included evaluating the position and difficulty of the impacted tooth that was indicated for surgical exposure, as well as a larger sample size and cultural diversity.

CONCLUSION

Within the limitations of the current study, it was found that surgical exposure of impacted teeth are more common among 16-20 years of age with female predilection associated with higher incidence of maxillary canines. Evidence suggests that surgical exposure of impacted canines followed by orthodontics is a treatment modality which yields stable long term results even though some attachment loss may occur. Successful completion of the treatment will aid in the preservation of teeth that are more significant for the patient's orthodontic, functional, and cosmetic stability.

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CONFLICT OF INTEREST:

None declared

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